

REMARKS/ARGUMENTS

Rejection of claims 1 and 3 under 35 U.S.C. 102(b) as being anticipated by US Patent No. 6516433 to Koenig.

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Claim 1 of present invention recites a defect root cause analysis having the steps of providing a die having a plurality of defects, dividing the defects into three defect types, performing a defect inspection to detect the sizes and locations of the defects, using three methods to perform a chemical state analysis corresponding to each defect type, performing a mapping analysis according to a result of the chemical state analysis, analyzing the root cause of the defects, and modifying the semiconductor process causing the defects. Specifically, as defined in paragraph [0026] of the original disclosure, the mapping analysis of the present invention involves first forming the defects into a defect pattern and then comparing the defect pattern with a predetermined pattern obtained from a previous semiconductor process.

Koenig in Col 4 lines 45-53 of the cited reference only teaches the steps of generating at least one predicted characteristic range and comparing the characteristic of the defect with the predicted characteristic range, but does not suggest any chemical state analysis that is specifically conducted for analyzing each type of defects. The limitation of using three methods to perform a chemical state analysis corresponding to each defect type as recited in claim 1 of the present invention is clearly not satisfied.

Moreover, despite Koenig in Col 2 lines 27-30 states that a defect-to-failure matching step is performed according to the characteristic of each defect to respectively generate a predicted failure region that is predicted to be electrically failed due to the defect, Koenig still fails to suggest that the predicted failure region is generated according to a result from the chemical state analysis, as recited in claim 1 of the present invention.

As the limitations of using three methods to perform a chemical state analysis corresponding to each defect type and performing a mapping analysis according to a result of the chemical state analysis are clearly absent in Koenig's invention,
5 applicants submit that the method of the present invention is patentable over the cited reference. Reconsideration of claim 1 is respectfully requested. As claim 3 is dependent upon claim 1, applicants submit that if claim 1 is found allowable, claim 3 should additionally be found allowable.

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Rejection of claims 4, 7 and 12 under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6516433 to Koenig in view of US Patent No. 6777677 to Nozoe et al.

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Claim 7 of the present invention recites another defect root cause analysis comprising the steps of providing a die having a plurality of defects, performing a voltage contrast to identify the location of the defects, cutting the die with a FIB to expose a cross-section of the die, performing a chemical state analysis on the cross-section of the die, performing a mapping analysis according to a result of the
20 chemical state analysis, and modifying the semiconductor process causing the defects to reduce the number of defects in the die.

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Similar to the arguments made for claim 1, Koenig in Col 4 lines 45-53 of the cited reference only teaches the steps of generating at least one predicted characteristic range and comparing the characteristic of the defect with the predicted characteristic range, but does not suggest any chemical state analysis that is specifically conducted for analyzing each type of defects.

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Moreover, despite Koenig in Col 2 lines 27-30 states that a defect-to-failure matching step is performed according to the characteristic of each defect to

respectively generate a predicted failure region that is predicted to be electrically failed due to the defect, Koenig still fails to suggest that the predicted failure region is generated according to a result from the chemical state analysis, as recited in claim 7 of the present invention.

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As the feature of performing a chemical state analysis is clearly absent in Koenig's invention, applicants submit that the two cited references cannot be combined in the manner suggested. Reconsideration of claim 7 is respectfully requested. As claims 4 and 12 are dependent upon claims 1 and 7, applicants submit that if claims 1 and 7 are found allowable, claims 4 and 12 should additionally be found allowable.

Rejection of claims 2, 5, 11 under 35 U.S.C. 103(a) as being unpatentable over Koenig in view of US Patent No. 5847821 to Tracy et al.

Claims 2, 5, 11 are dependent upon claims 1 and 7, applicants submit that if claims 1 and 7 are found allowable, claims 2, 5, 11 should additionally be found allowable.

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Rejection of claims 6 and 9 under 35 U.S.C. 103(a) as being unpatentable over Koenig in view of US Patent No. 5561293 to Peng et al.

Claims 6 and 9 are dependent upon claims 1 and 7, applicants submit that if claims 1 and 7 are found allowable, claims 6 and 9 should additionally be found allowable.

Rejection of claim 10 under 35 U.S.C. 103(a) as being unpatentable over Koenig

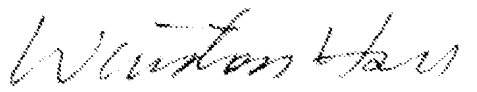
in view of US Publication 2003/0208731 to Miwa.

Claim 10 is dependent upon claim 7, applicants submit that if claim 7 is found allowable, claim 10 should additionally be found allowable.

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Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

10 Sincerely yours,



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Note: Please leave a message in my voice mail if you need to talk to me. (The time in
20 D.C. is 12 hours behind the Taiwan time, i.e. 9 AM in D.C. = 9 PM in Taiwan.)